Tropentag 2023
Berlin, Germany
Sept. 20th-22nd 2023

Economic performance and greenhouse gas emissions of two typical beef production systems in Eastern Kenya

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Introduction

Greenhouse gas (GHG) emission intensity of beef in Eastern Africa is among the highest globally.

Kenya‘s Nationally Determined Contribution aims to reduce the ag-sectors emissions by 32% by 2030 – of which 90% come from livestock production.

The majority of Kenya´s cattle herd is raised in its arid and semi-arid lands (ASALs), mainly producing beef.

- Aim: Analyse status quo and identify GHG mitigation strategies for beef production

Study sites

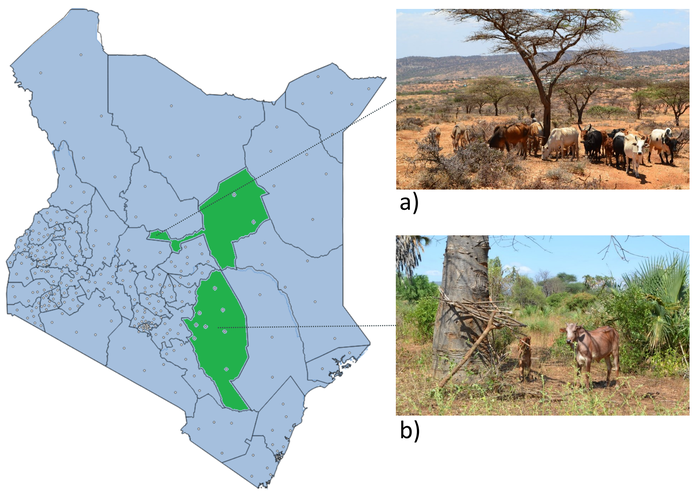

Figure 2: Location of typical beef PS in Kenya

- a) **Pastoral beef** PS (Isiolo county)
- b) **Agro-pastoral beef** PS (Kitui county)

Conclusion

- **Low-investment** PS, adapted to local conditions, but vulnerable to external (weather) factors.
- GHG emission intensity high due to **low productivity and performance** (age of first calving, average daily weight gain) and high mortality rates.
- **GHG mitigation strategies require private investment** and replacement of communal goods (pasture and water).
- **Improving the quality of inputs** (feed, water, genetics) is crucial for enhancing beef production in Eastern Kenya.

Methodology

The **Typical Farm Approach** (TFA) was used to investigate the structure, practices and economics of beef production systems (PS).

Figure 1: Overview of the typical farm approach (*agri benchmark* SOP)

Forage characteristics were derived from **public databases** (Feedipedia, ILRI SSA Feeds).

Economics of beef production were calculated with the **TIPI-CAL tool** of the *agri benchmark* network.

GHG emissions of animal and forage production were estimated according **IPCC 2019 refinement** guidelines, Tier 1/2.

Results

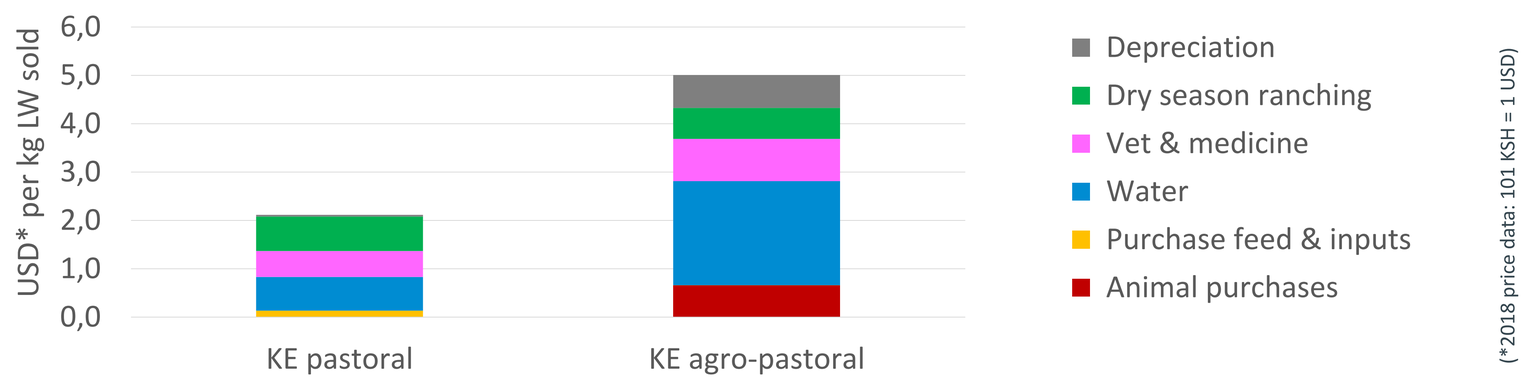

Figure 3: Costs of production per kg live weight (LW) sold and its composition for two typical beef PS

- Water and feed in dry seasons account for >50% of the costs for means of production.

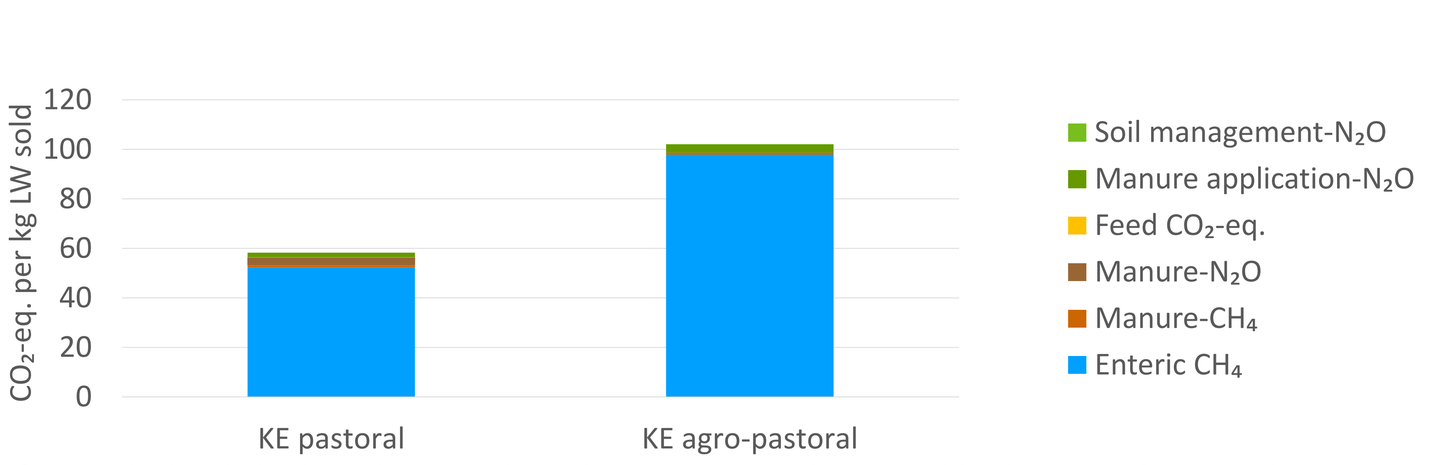

Figure 4: GHG emission intensity per kg live weight (LW) sold and its composition for two typical beef PS

- ~ 85% of GHG emissions can be allocated to the cow-calf enterprise.

References

Chibanda, C., Agethen, K., Deblitz, C , Zimmer, Y, Almadani, M. I, Garming, H, Rohlmann, C., Schütte, J., Thobe, P., Verhaagh, M., Behrendt, L., Staub, D., & Lasner, T. (2020). **The Typical Farm Approach and Its Application by the Agri Benchmark Network**. Agriculture, 10(12), 646.

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Part of the **GRA Flagship** project **EMiFa**

Data collection supported by: Tegemeo Institute of Agricultural Policy and Development, Nairobi , Kenya